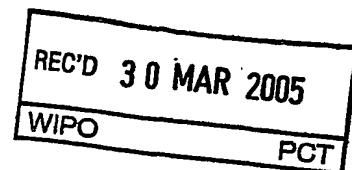


# PATENT COOPERATION TREATY

## PCT



### INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)



Applicant's or agent's file reference PA136290/PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/IB 03/05008	International filing date (day/month/year) 07.11.2003	Priority date (day/month/year) 09.11.2002
International Patent Classification (IPC) or both national classification and IPC C07K7/23		
Applicant MILLAR, Robert, Peter et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.  
  
☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of    sheets.

3. This report contains indications relating to the following items:
  - I    ☒ Basis of the opinion
  - II   ☐ Priority
  - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV   ☐ Lack of unity of invention
  - V    ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI   ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  01.06.2004	Date of completion of this report  29.03.2005
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Mueller, F  Telephone No. +49 89 2399-7722 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/IB 03/05008**

**Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-22 as originally filed

**Sequence listings part of the description, Pages**

1 as originally filed

**Claims, Numbers**

1-29 as originally filed

**Drawings, Sheets**

1/11-11/11 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☒ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☒ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☒ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/IB 03/05008**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 17-22

because:

☒ the said international application, or the said claims Nos. 17-22 relate to the following subject matter which does not require an international preliminary examination (specify):

**see separate sheet**

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-29
	No: Claims	
Inventive step (IS)	Yes: Claims	1-29
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-29?
	No: Claims	

**2. Citations and explanations**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application.No. **PCT/B 03/05008**

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**see separate sheet**

**Re Item I**

**Basis of the report**

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

Claims 17-22 relate to subject-matter considered by this Authority to be covered by the provision of Rule 67(iv) PCT. Consequently, no opinion will be formulated with respect to the industrial applicability of the subject-matter of these claims (Article 34(4)(a)(I) PCT).

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: CHATURVEDI N. ET AL.,: INT.J.PEPTIDE PROTEIN RES., vol. 17, 1981, pages 72-88
- D2: WO 92/12247 A
- D3: BEEKMAN N.J.C.M. ET AL.,: VACCINE, vol. 17, - 1999 pages 2043-2050,
- D4: MILLER L.A. ET AL.,: AM. J. REPRODUCTIVE IMMUNOLOGY, vol. 44, November 2000 (2000-11), pages 266-274

The subject-matter of claim 1, a synthetic peptide of D-amino acids with the described sequence, is novel (Article 33(2) PCT). The same holds true for claims 2-29.

The prior art already describes modified peptide sequences on basis of the Gonadotropin-releasing Hormone, GnRH, also known as luteinizing hormone releasing hormone, LH-RH. D1 describes the synthesis of partial retro-inverso LH-RH isomers, see e.g. Scheme 1, 2 which are used for the modifying the biological activity of LH-RH, see p. 87, 2.col., last par. ff.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IB 03/05008

D2, describes partial retro-inverso piscine Gn-RH peptide sequences, which also comprise a D-amino acid and which are used as a vaccine in controlling the fertility in fish, see claims.

D3, describes tandem peptides of GnRH for inducing an immune response against GnRH and therewith provides a method for immunocastration of pigs, see e.g. discussion and Tables.

D4 describes the use of KLH-GnRH vaccines as an immunocontraceptive in deer.

None of the prior art documents give an indication to the person skilled in the art to use full retro-inverso peptide sequences of GnRH which comprises all D-amino acids for the sequence GPRLGYSWH in a vaccine composition for controlling fertility and for treating sex hormone related diseases. The used peptide sequences are resistant to protease, p. 19, l.29, do not require conjugation to an immunogenic carrier protein, p. 20, l.8, and are suitable for producing high titres, p.20, l.11. An inventive step for claim 1 can therefore be acknowledged (Article 33(3) PCT).

The same holds true for claims 2-29.

**Re Item VII**

**Certain defects in the international application**

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2 is not mentioned in the description, nor are these documents identified therein.

**Re Item VIII**

**Certain observations on the international application**

Claim 1 is not clear (Article 6 PCT). It seems from the description that the structural feature of "retro-inverso" for the claimed peptide sequences is essential for carrying out the claimed invention. This feature therefore has to be introduced into the wording of the claim.